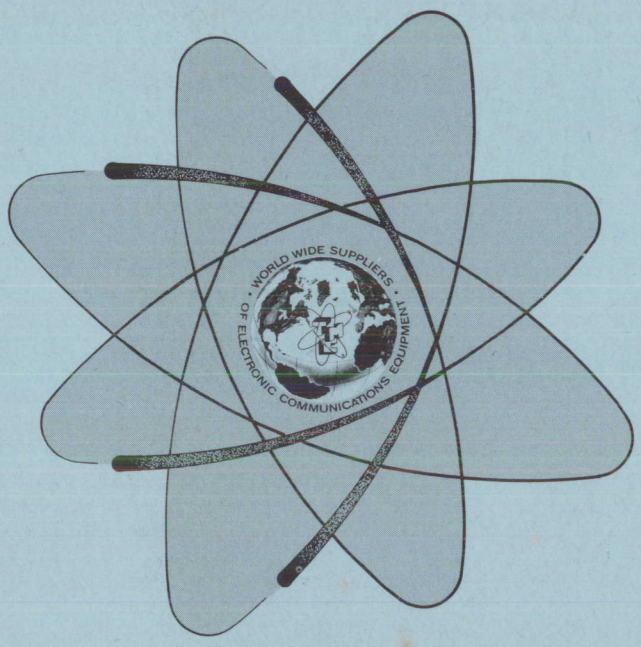
TECHNICAL MANUAL

for

HIGH FREQUENCY

TRANSMIT/RECEIVE SHIP SET

MODEL SYM5201



THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y. OTTAWA, ONTARIO

Printed in U.S.A.

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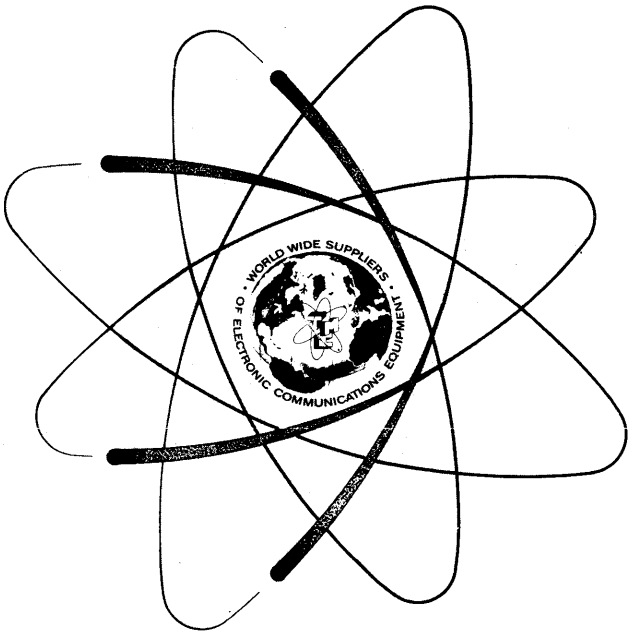

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MAMARONECK, N.Y. OTTAWA, ONTARIO

Printed in U.S.A.

IN 5201

Issue Date: JUNE 1973

THE TECHNICAL MATERIEL CORPORATION
COMMUNICATIONS ENGINEERS
700 FENIMORE ROAD MAMARONECK, N. Y.

Warranty

The Technical Materiel Corporation, hereinafter referred to as TMC, warrants the equipment (except electron tubes,* fuses, lamps, batteries and articles made of glass or other fragile or other expendable materials) purchased hereunder to be free from defect in materials and workmanship under normal use and service, when used for the purposes for which the same is designed, for a period of one year from the date of delivery F.O.B. factory. TMC further warrants that the equipment will perform in a manner equal to or better than published technical specifications as amended by any additions or corrections thereto accompanying the formal equipment offer.

TMC will replace or repair any such defective items, F.O.B. factory, which may fail within the stated warranty period, PROVIDED:

1. That any claim of defect under this warranty is made within sixty (60) days after discovery thereof and that inspection by TMC, if required, indicates the validity of such claim to TMC's satisfaction.
2. That the defect is not the result of damage incurred in shipment from or to the factory.
3. That the equipment has not been altered in any way either as to design or use whether by replacement parts not supplied or approved by TMC, or otherwise.
4. That any equipment or accessories furnished but not manufactured by TMC, or not of TMC design shall be subject only to such adjustments as TMC may obtain from the supplier thereof.

Electron tubes furnished by TMC, but manufactured by others, bear only the warranty given by such other manufacturers. Electron tube warranty claims should be made directly to the manufacturer of such tubes.

TMC's obligation under this warranty is limited to the repair or replacement of defective parts with the exceptions noted above.

At TMC's option any defective part or equipment which fails within the warranty period shall be returned to TMC's factory for inspection, properly packed with shipping charges prepaid. No parts or equipment shall be returned to TMC, unless a return authorization is issued by TMC.

No warranties, express or implied, other than those specifically set forth herein shall be applicable to any equipment manufactured or furnished by TMC and the foregoing warranty shall constitute the Buyers sole right and remedy. In no event does TMC assume any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of TMC Products, or any inability to use them either separately or in combination with other equipment or materials or from any other cause.

*Electron tubes also include semi-conductor devices.

PROCEDURE FOR RETURN OF MATERIAL OR EQUIPMENT

Should it be necessary to return equipment or material for repair or replacement, whether within warranty or otherwise, a return authorization must be obtained from TMC prior to shipment. The request for return authorization should include the following information:

1. Model Number of Equipment.
2. Serial Number of Equipment.
3. TMC Part Number.
4. Nature of defect or cause of failure.
5. The contract or purchase order under which equipment was delivered.

PROCEDURE FOR ORDERING REPLACEMENT PARTS

When ordering replacement parts, the following information must be included in the order as applicable:

1. Quantity Required.
2. TMC Part Number.
3. Equipment in which used by TMC or Military Model Number.
4. Brief Description of the Item.
5. The *Crystal Frequency* if the order includes crystals.

PROCEDURE IN THE EVENT OF DAMAGE INCURRED IN SHIPMENT

TMC's Warranty specifically excludes damage incurred in shipment to or from the factory. In the event equipment is received in damaged condition, the carrier should be notified immediately. Claims for such damage should be filed with the carrier involved and not with TMC.

All correspondence pertaining to Warranty Claims, return, repair, or replacement and all material or equipment returned for repair or replacement, within Warranty or otherwise, should be addressed as follows:

THE TECHNICAL MATERIEL CORPORATION
Engineering Services Department
700 Fenimore Road
Mamaroneck, New York

RECORD OF CORRECTIONS MADE

Change No.	Date of Change	Date Entered	Entered By

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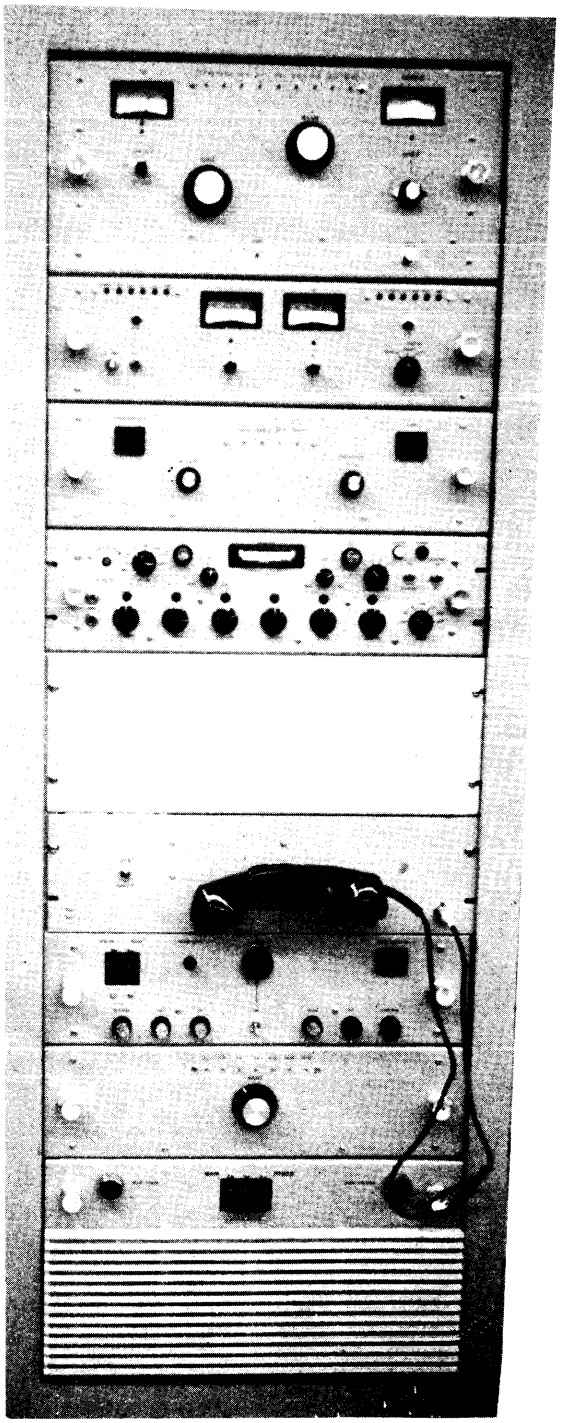


Figure 1-1. High Frequency Transmit/Receive Ship Set Model SYM5201

SECTION 1

GENERAL INFORMATION

1-1. SCOPE OF TECHNICAL MANUAL.

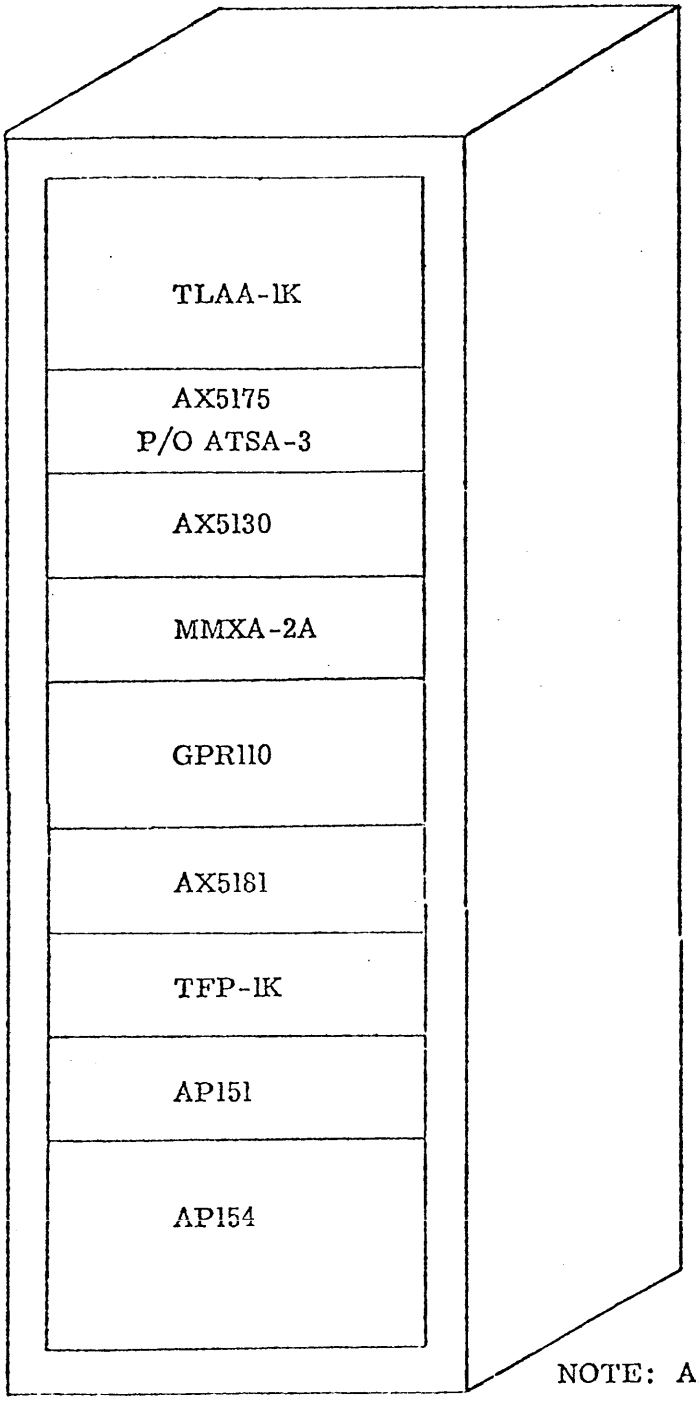
This technical manual presents operating and maintenance instructions for the High Frequency Transmit/Receive Ship Set, Model SYM5201 designed and manufactured by The Technical Materiel Corporation, Mamaroneck, New York. The complete technical manual is comprised of this system manual and several modular manuals on individual components of the system. The modular manuals include general descriptions of the equipment; installation and operating procedures; principles of operation; maintenance and troubleshooting data; and parts listings.

1-2. FUNCTIONAL DESCRIPTION.

The High Frequency Transmit/Receive Ship Set, Model SYM5201 (shown in figure 1-1) is a communications system designed for single sideband transmission and reception in the high frequency range (2 to 30 mhz). Ths ship set system, herinafter referred to as SYM5201 is comprised of General Purpose Receiver, Model GPR-110, Handset Panel, Model AX5181, and Automated High Frequency Transmitter, Model HFTA-1KJ2(3P). The HFTA-1KJ2(3P) transmitter is made up of a Multi-Mode Exciter, Model MMX(A)-2A, driving a Linear Power Amplifier, Model HFLA-1K(3P), and an automated Antenna Tuning System, Model ATSA-3, which couples and matches the transmitter output to a 35 foot whip antenna.

1-3. PHYSICAL DESCRIPTION

With the exception of the AX5176 tuning unit portion of the ATSA-3, all components of the SYM5201 are housed in a single equipment cabinet, model CAB-50. Figure 1-2 shows the location of SYM5201 system components within the equipment cabinet. The AX5176 tuning unit portion of the ATSA-3 is mounted external to the equipment cabinet at the base of the 35 foot whip antenna.



NOTE: AX5176 (P/O ATSA-3) mounted at base of antenna.

Figure 1-2. System Components of SYM5201

SECTION 2

INSTALLATION

2-1. INITIAL UNPACKING AND INSPECTION.

The SYM5201 was assembled, calibrated and tested at the factory before shipment. Inspect all packages for possible damage during transit. The Technical Materiel Corporation will assist in describing methods of repair and furnishing of replacement parts. Carefully unpack each crate as indicated by the packing list provided with the transmitter shipment. Inspect all packing materials for parts thay may have been shipped as loose items (cabinet hardware, connectors, technical manuals, etc.).

2-2. POWER REQUIREMENTS.

The SYM5201 requires a three phase source of 440 vac, 50/60 hz at approximately 3 kilowatts.

2-3. INSTALLATION.

a. General

A minimum number of assemblies, subassemblies, components and hardware have been disassembled from the equipment and separately packaged, thus reducing the possibility of equipment damage in transit. The method of disassembly and separate packaging also permits realistic equipment handling.

Cables, wires, and other miscellaneous items that are disconnected during equipment disassembly are tagged and taped to the equipment. The information on a given tag indicates the designated terminal on a component to which the tagged item must be connected. Make sure all packing material, tags and tape have been removed before sealing-up the cabinet or section of the cabinet with a front panel drawer.

b. Component Installation

The elevation and mounting details for typical installation of the SYM5201 are shown in figure 2-1. The following units in the system are slide mounted: the GPR-110 receiver, all components of the HFLA-1K (TLAA-1K, AX5130, AP151, and AP152), the MMX(A)-2A, the ATSA-3 control unit (AX5175) and the TFP-1K. The modular units of the HFLA-1K should be installed into the equipment rack by referring to the detailed installation procedural steps in the technical manual for the HFLA-1K. The GPR-110, the TFP-1K, ATSA-3 control unit (AX5175), and MMX(A)-2A should be installed in the equipment rack in the same manner as the HFLA-1K modular units; the front panel of the MMX(A)-2A should be fastened to the rack with four screws and four washers. The remaining components of the transmitter are rack mounted; they should be affixed in their proper positions and each unit fastened to the equipment rack with its front panel locks or with four screws and four washers.

The AX5176 tuning unit portion of the ATSA-3 is installed external to the system equipment cabinet, at the base of the associated antenna. For installation details for the AX5176 tuning unit, refer to the ATSA-3 technical manual.

The power transformer for 440 vac operation is removed from the equipment cabinet for shipment. The power transformer should be mounted and secured to the transformer assembly plate in the rear of the equipment cabinet. (Refer to figure 2-2.)

c. Interconnection

External connections to the system should be made to the interface panel located in the rear bottom of the equipment rack. The connectors required are supplied as loose items with the system.

WARNING

BEFORE MAKING EXTERNAL CONNECTIONS TO THE TRANSMITTER, INSURE THAT THE EXTERNAL PRIMARY POWER IS OFF AND TAGGED.

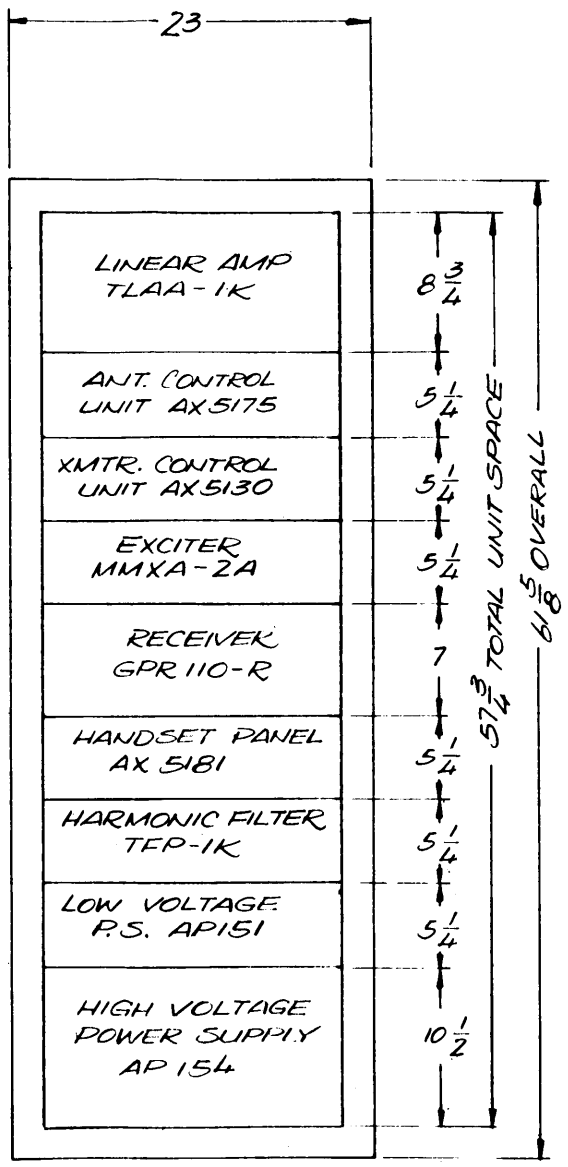
The external cables should be routed into the base assembly and secured to the appropriate connectors on the interface panel (refer to figures 2-2 and 2-3).

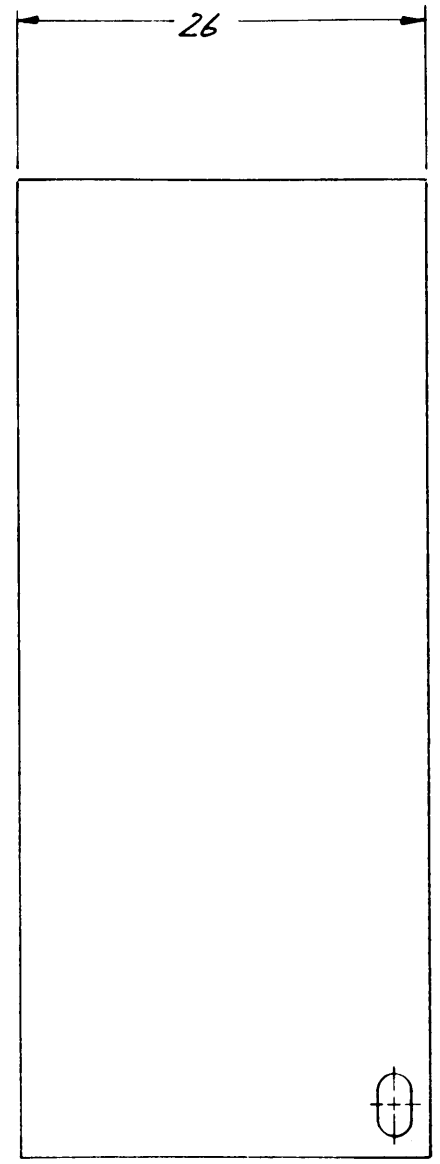
The primary power input lines should be routed into the base assembly and up through the right side opening in the transformer mounting plate. The primary input lines should then be connected to the appropriate primary taps on the power transformer (marked 440). The power input lines to the HFLA-1K (specifically the AP154 high voltage power supply) should be connected to the appropriate secondary taps on the power transformer (marked 230).

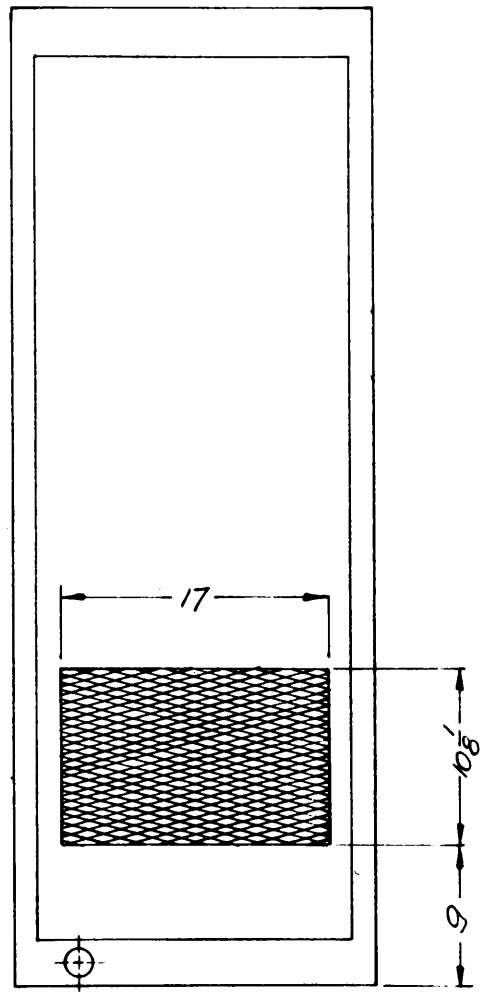
The AX5176 tuning unit portion of the ATSA-3 antenna tuning system must be interconnected with the SYM5201 equipment cabinet. (Refer to figure 2-4 and to the ATSA-3 technical manual).

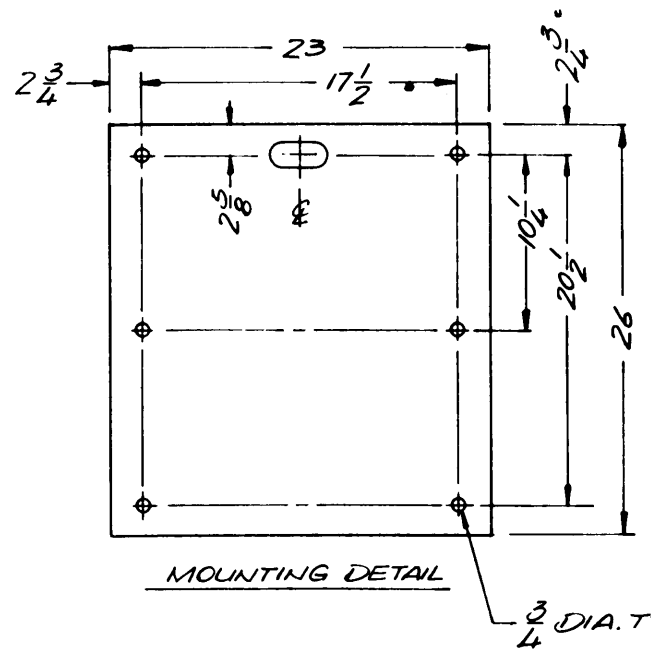
2-4. PRE-OPERATIONAL CHECK.

Although the system has been aligned and throughly checked against the manufacturer's specifications prior to shipment, it is necessary to ensure correct installation and proper operation by referring to pre-operational checks in the applicable technical manuals for the modular units. Performance checks of the ATSA-3, the high voltage transformer check of the HFLA-1K, and the initial checkout of the MMX(A)-2A and GPR-110 should be performed.

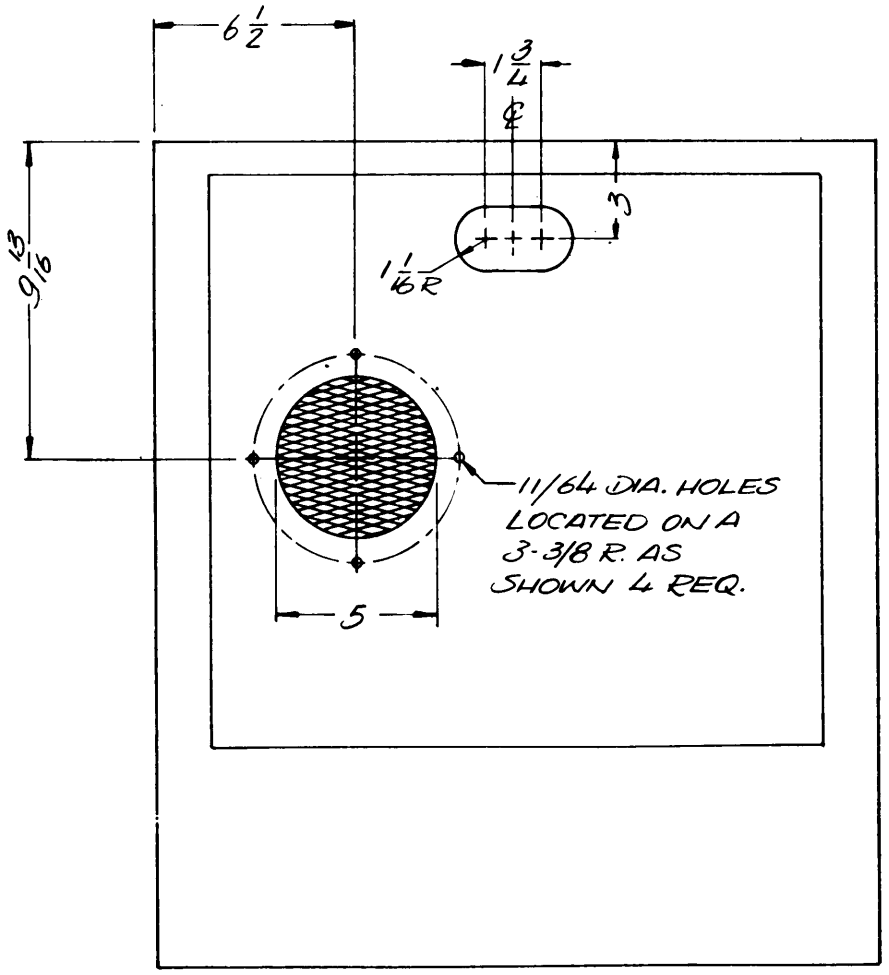








MOUNTING DETAIL



FRONT

Figure 2-1. Elevation and Mounting Dimensions for SYM5201

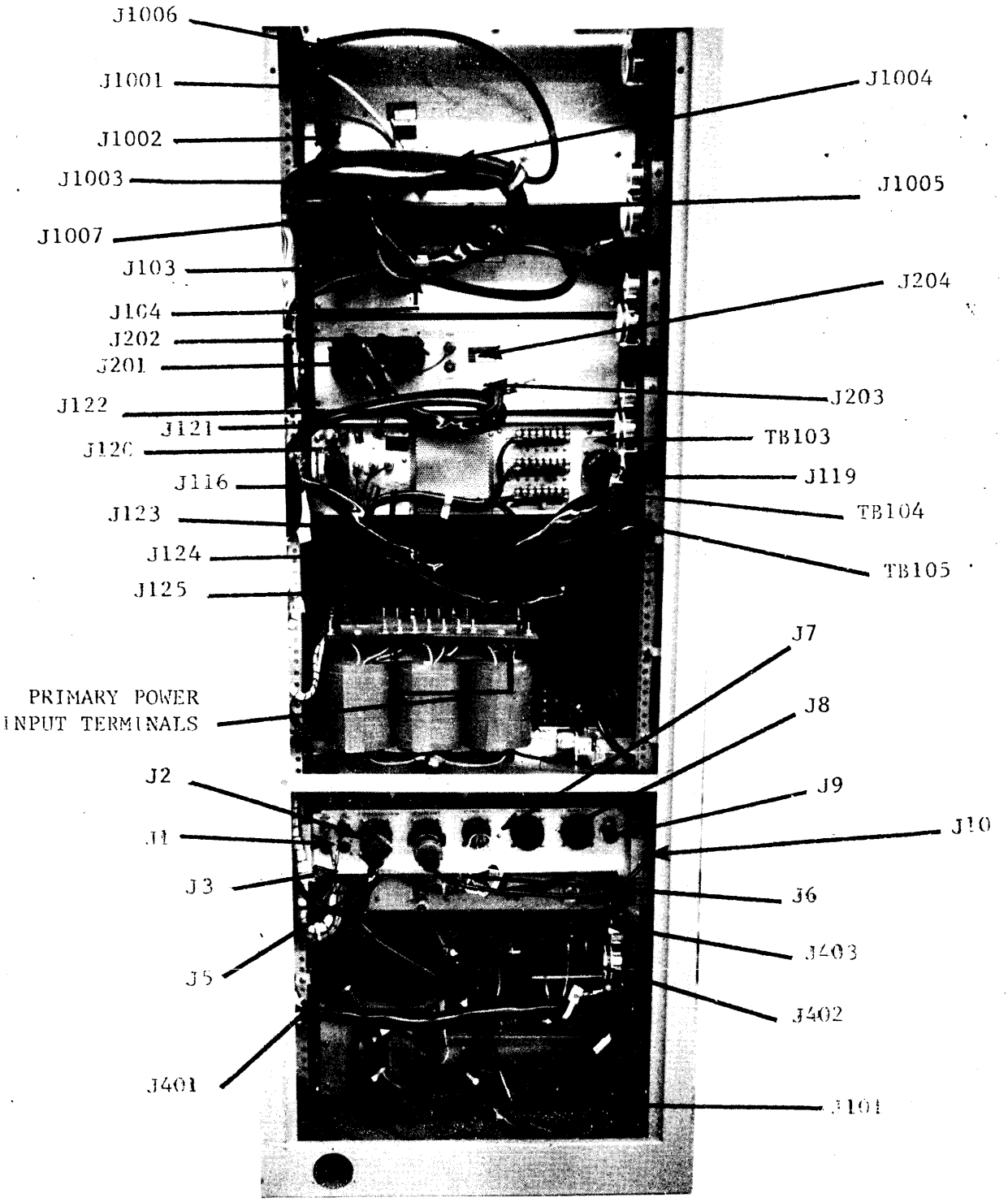


Figure 2-2. Location of Interconnect Jacks on Rear of SYM5201

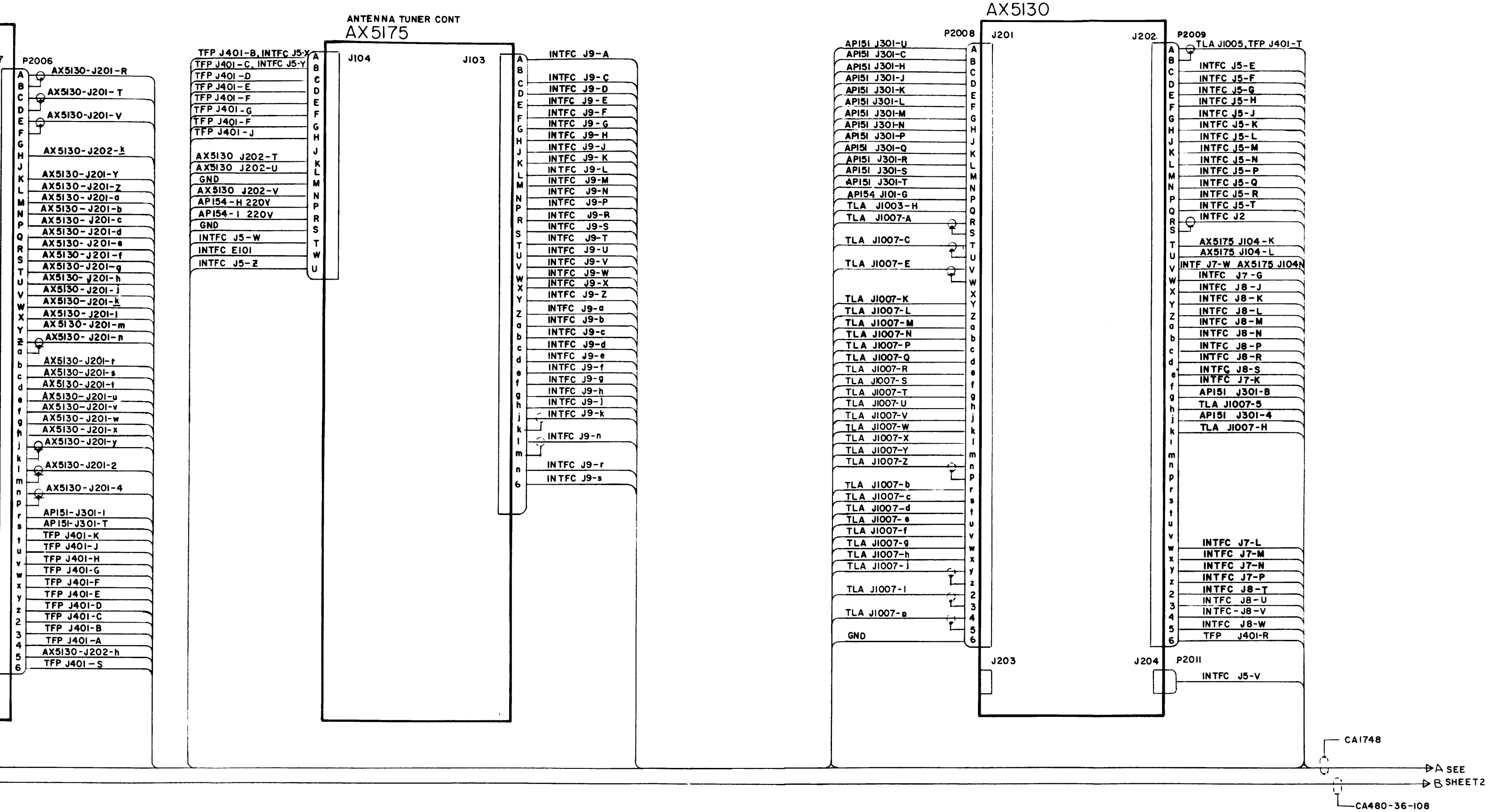
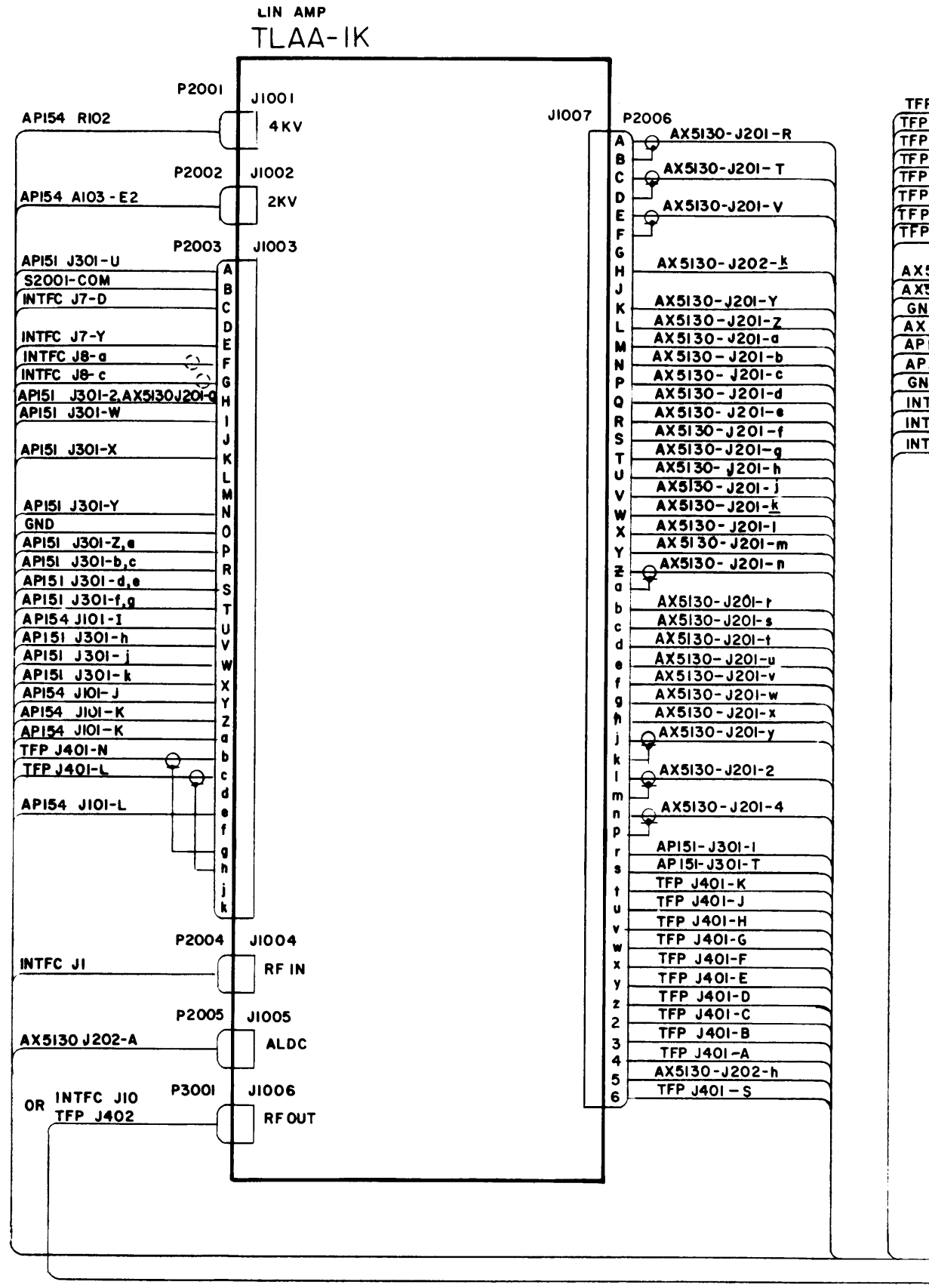


Figure 2-3. SYM5201 Interconnect Wiring Diagram (Sheet 1 of 4)



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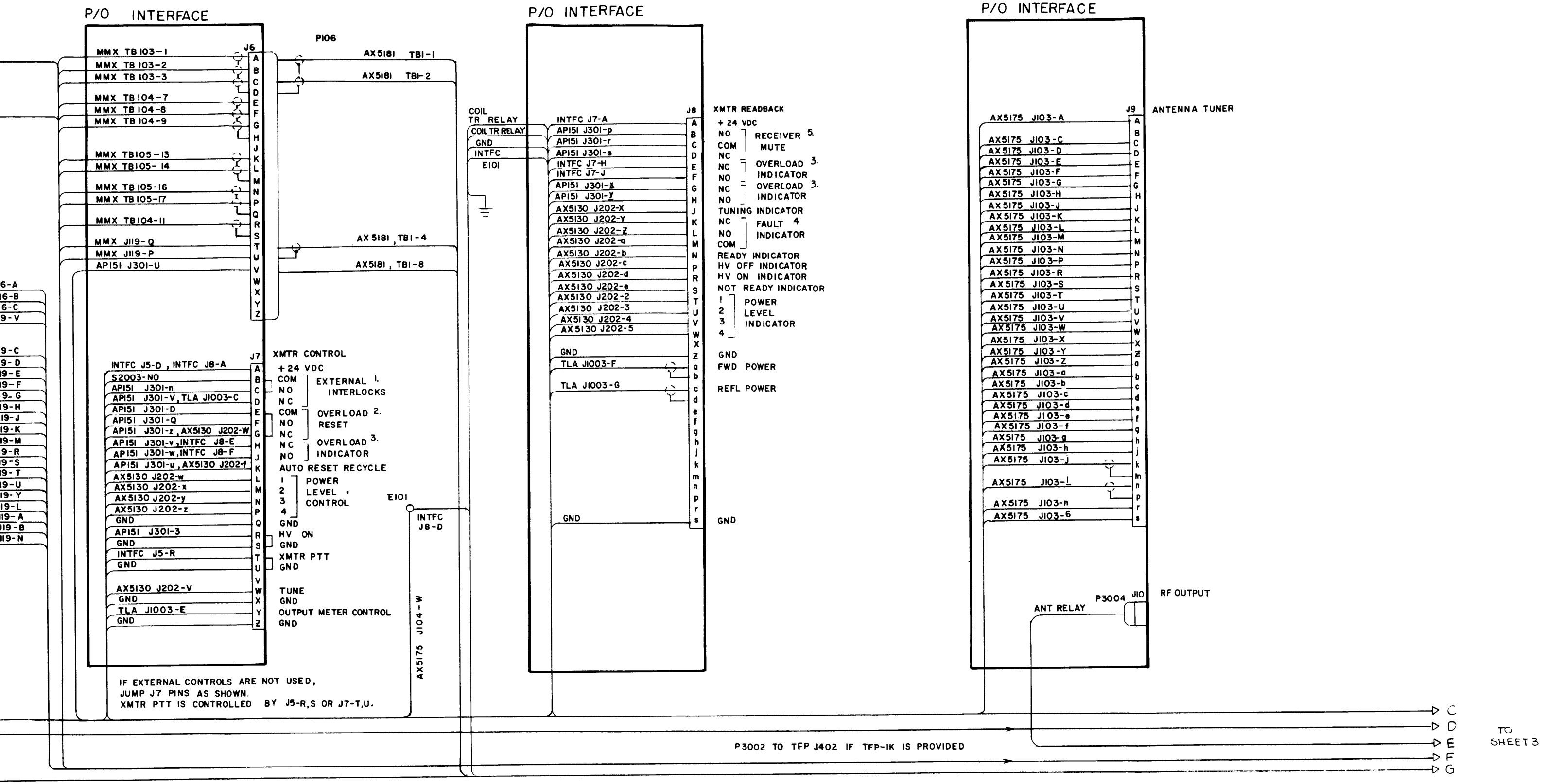
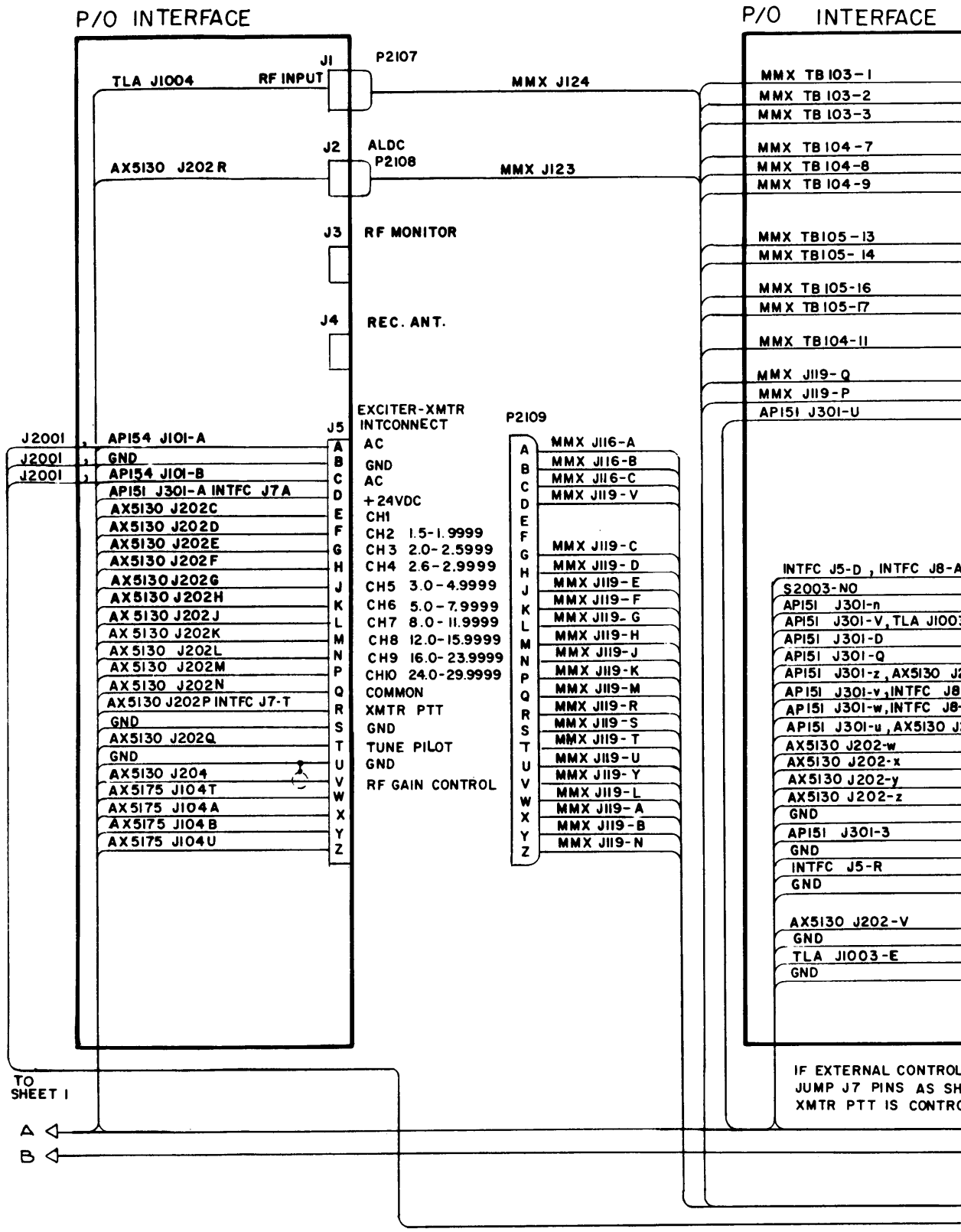


Figure 2-3. SYM5201 Interconnect Wiring Diagram (Sheet 2 of 4)



1. INTERLOCK TERMINAL DESIGNATIONS ARE FOR INACTIVATED SWITCH.
2. OVERLOAD RESET TERMINAL DESIGNATIONS ARE FOR INACTIVATED SWITCH.
3. OVERLOAD INDICATOR TERMINAL DESIGNATIONS ARE FOR OVERLOAD CONDITION.
4. FAULT INDICATOR TERMINAL DESIGNATIONS ARE FOR FAULT CONDITION.
5. RECEIVER MUTE TERMINAL DESIGNATIONS ARE FOR XMTR OFF CONDITION.

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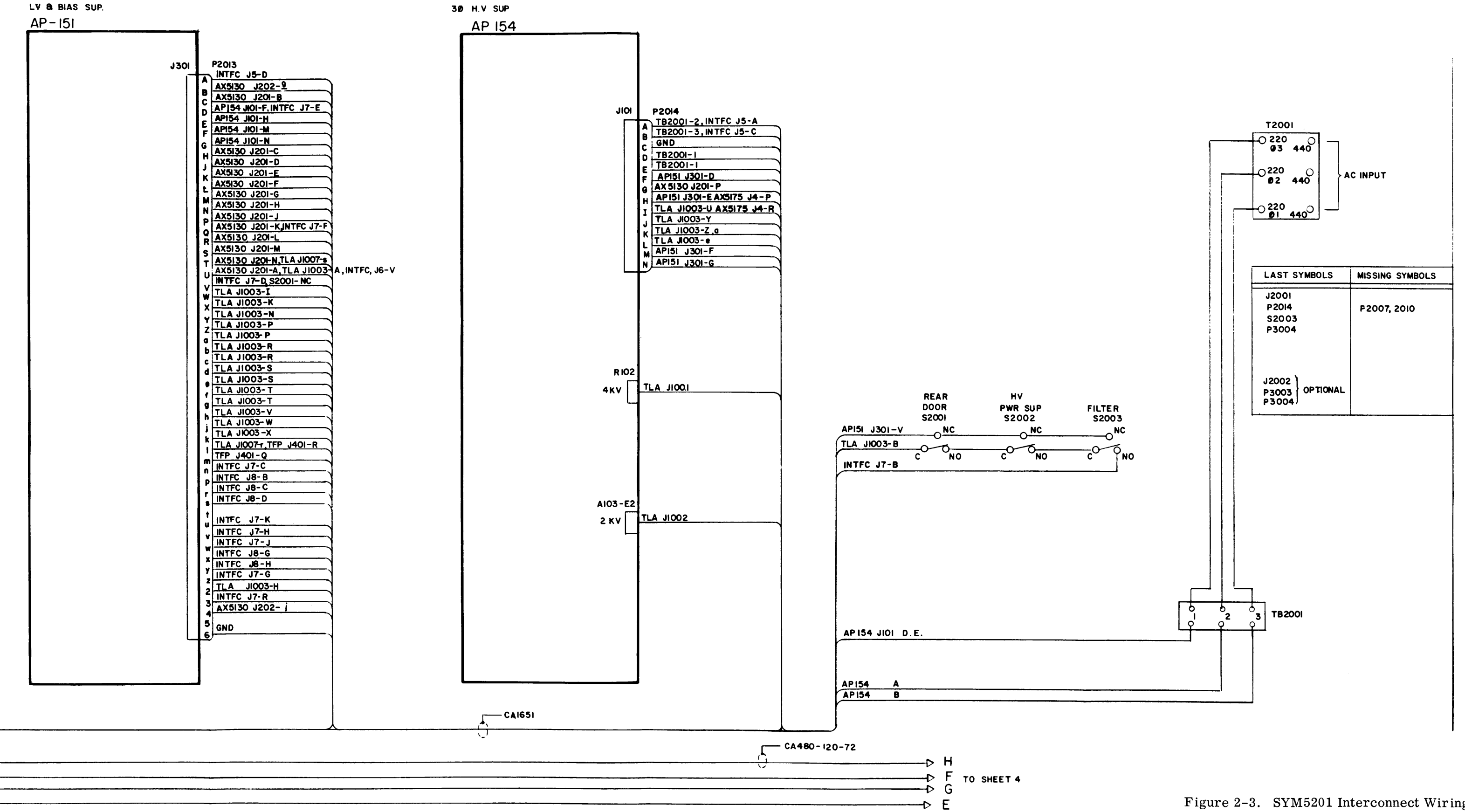
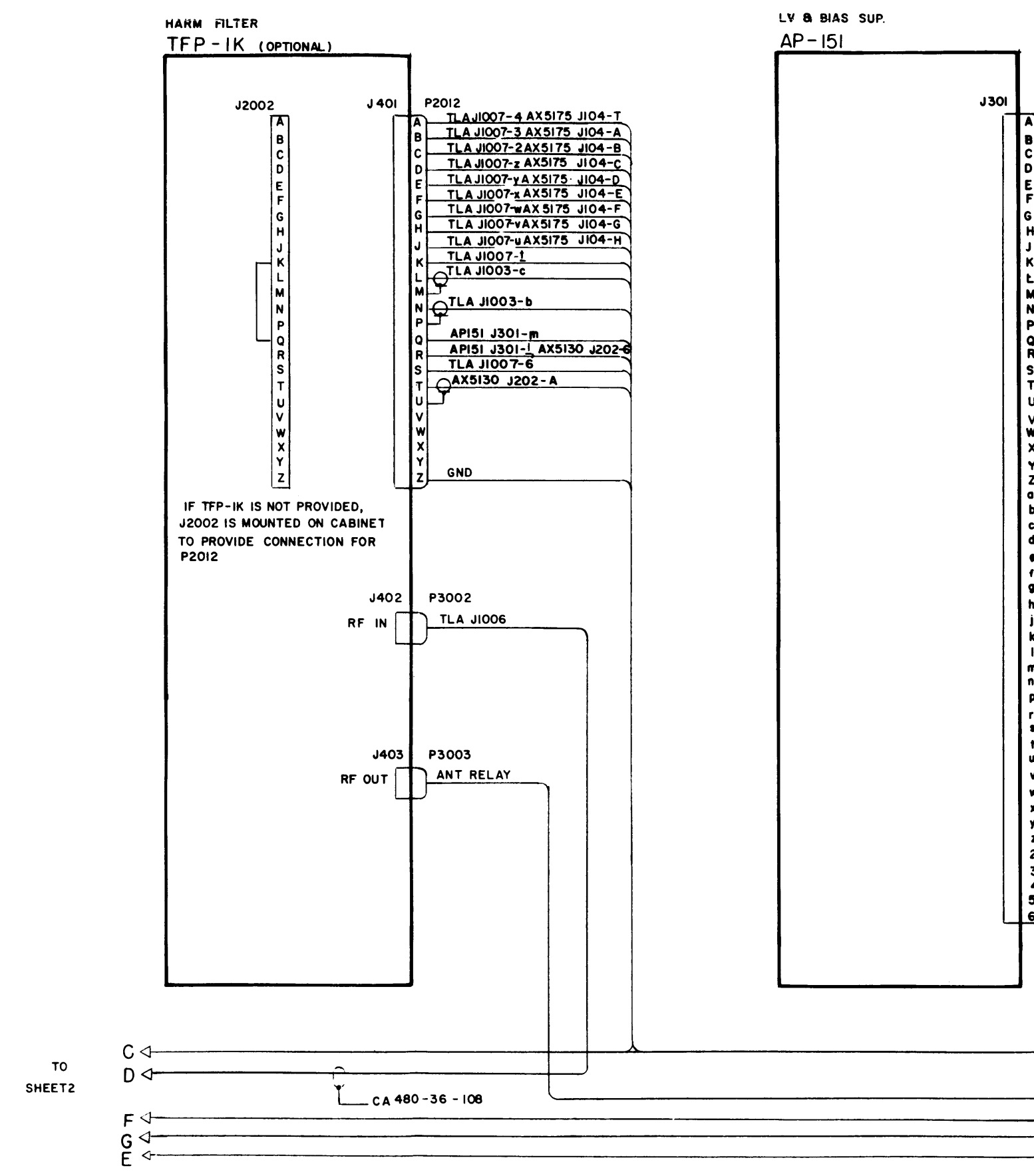


LAST SYMBOLS	MISSING SYMBOLS
J2001 P2014 S2003 P3004	P2007, 2010
J2002 P3003 P3004 (OPTIONAL)	

Figure 2-3. SYM5201 Interconnect Wiring Diagram (Sheet 3 of 4)



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MMX A-2A

TB103

1
2
3
4
5
6

TB104

7
8
9
10
11
12

TB105

13
14
15
16
17
18

J116

A P2109-A
B P2109-B
C P2109-C

J119

A P2109-X
B P2109-Y
C P2109-G
D P2109-H
E P2109-J
F P2109-K
G P2109-L
H P2109-M
J P2109-N
K P2109-P
L P2109-W
M P2109-Q
N P2109-Z
P J6-U
Q J6-T
R P2109-R
S P2109-S
T P2109-T
U P2109-U
V P2109-D
W
X P2109-V
Y
Z

J123
ALOC

P2108

P2107

J124
RF OUT

CA1751

HAND SET PANEL
AX5181

TB1

1
2
3
4
5
6
7
8
9 MIKE
10 PTT
11 REC AUD.
12 REC AUD.
13 GND
14

REMOTE PHONE

P106-A
P106-C
P106-T
AX5184, J103-15
AX5184, J103-13
P106-V

AUX. SW

REC MUTE J103-7
REC MUTE J103-8

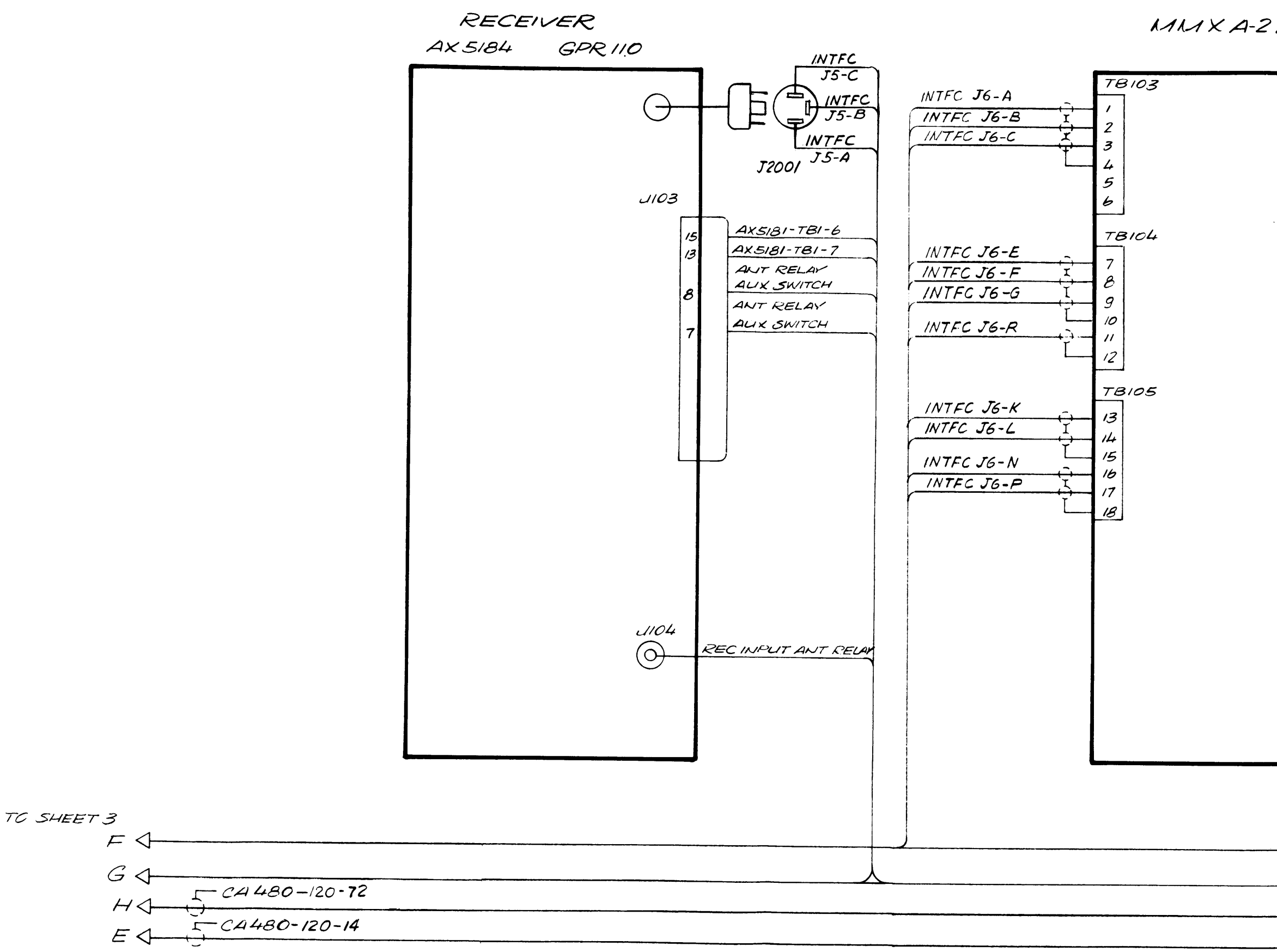
AX5184

XMIT
REC
TED, RF OUT
REC INPUT
COIL
ANT
INTFC. J8-B
INTFC. J8-A

INTFC, RF OUT

CA1751

Figure 2-3. SYM5201 Interconnect Wiring Diagram (Sheet 4 of 4)



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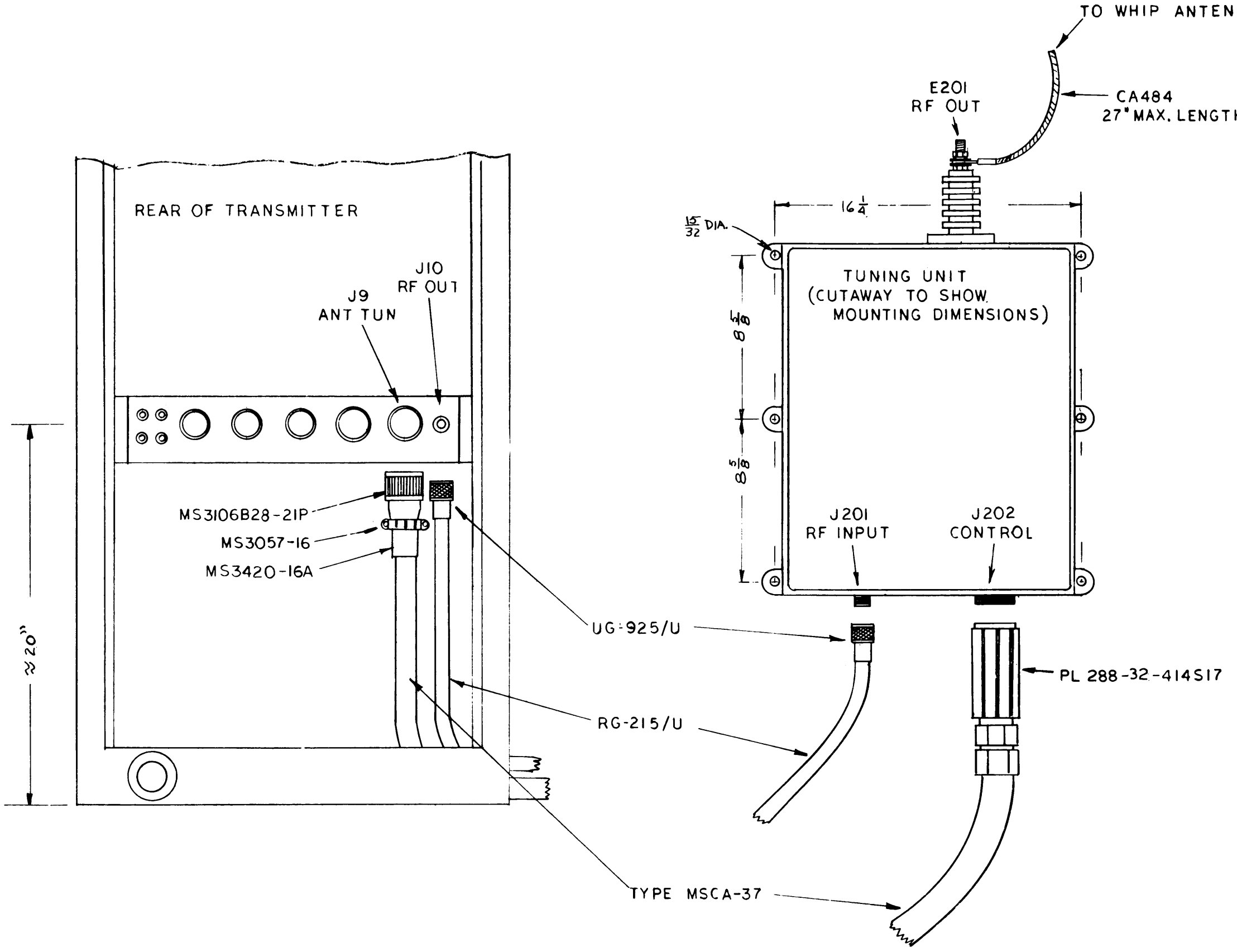

CONTROL CABLE INTERCONNECTION	
FROM J9 PIN NO.	TO J202 PIN NO.
A	A
B	B
C	C
D	D
E	E
F	F
G	G
H	H
J	J
K	K
L	L
M	M
N	N
P	P
R	R
S	S
T	T
U	U
V	V
W	W
X	X
Z	Y
a	Z
b	a
c	b
d	c
e	d
f	e
g	f
h	g
j	h
k	j
m	k
n	L
p	m
r	n
s	6

Figure 2-4. AX5176 Tuning Unit and SYM5201 Equipment Cabinet Interconnect

SECTION 3

OPERATOR'S SECTION

3-1. GENERAL.

Operating procedures for the transmit function of the SYM5201 High Frequency Transmit/Receive Ship Set are contained in section 3 of the modular technical manual for the HFTA-1KJ2. Operating procedures for the receive function of the SYM5201 system are contained in section 3 of the modular technical manual for the GPR-110. Specific considerations for operation of the SYM5201 as a system are detailed in paragraph 3-2.

3-2. SYSTEM OPERATION.

The AX5181 handset panel is used in operation of both transmit and receive functions of the SYM5201 system. A LOCAL/REMOTE switch on the AX5181 provides selection of either local (equipment cabinet handset) or remote (ship's bridge) control of the PTT and audio transmit and receive functions The SYM5201 system also incorporates a bypass mode for transmission and reception on different frequencies. With the bypass mode disabled (BYPASS/OFF switch on AX5175 tuning control unit set to OFF), the antenna input is routed thru the AX5176 antenna tuning unit to the GPR-110 receiver. When the BYPASS/OFF switch is set to BYPASS, the antenna input will bypass the AX5176 antenna tuning unit during receive functions and be routed directly to the GPR-110 receiver.

SECTION 4

SCHEMATIC DIAGRAMS

4-1. GENERAL.

The schematic diagrams for components of the SYM5201 are contained in the individual modular technical manuals. The interconnect wiring diagram for the system is figure 2-3 of this system manual. Figure 4-1 is the schematic diagram for the AX5181 handset panel.

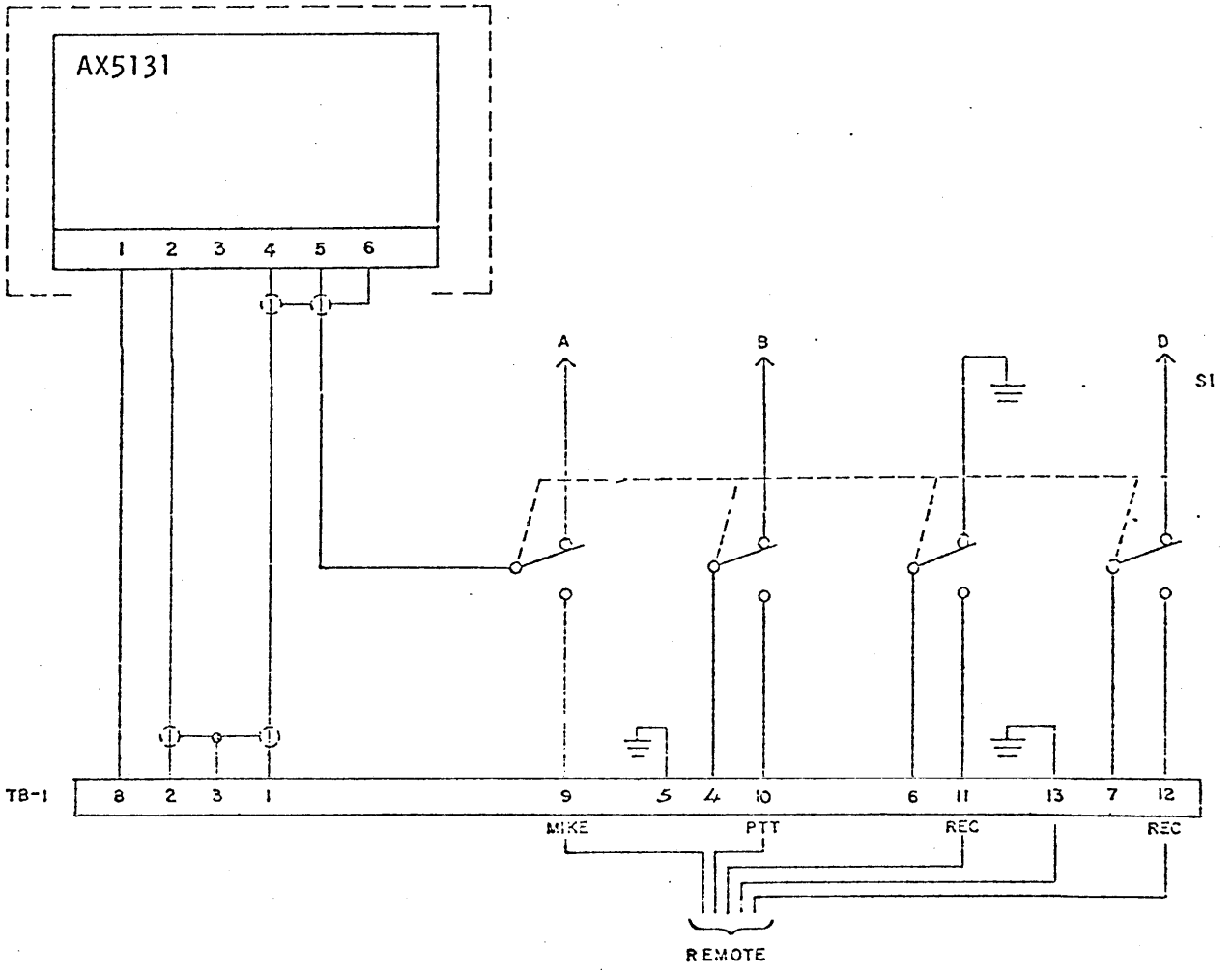

Figure 4-1. Schematic Diagram, AX5181 Handset Panel